

Fig. 1

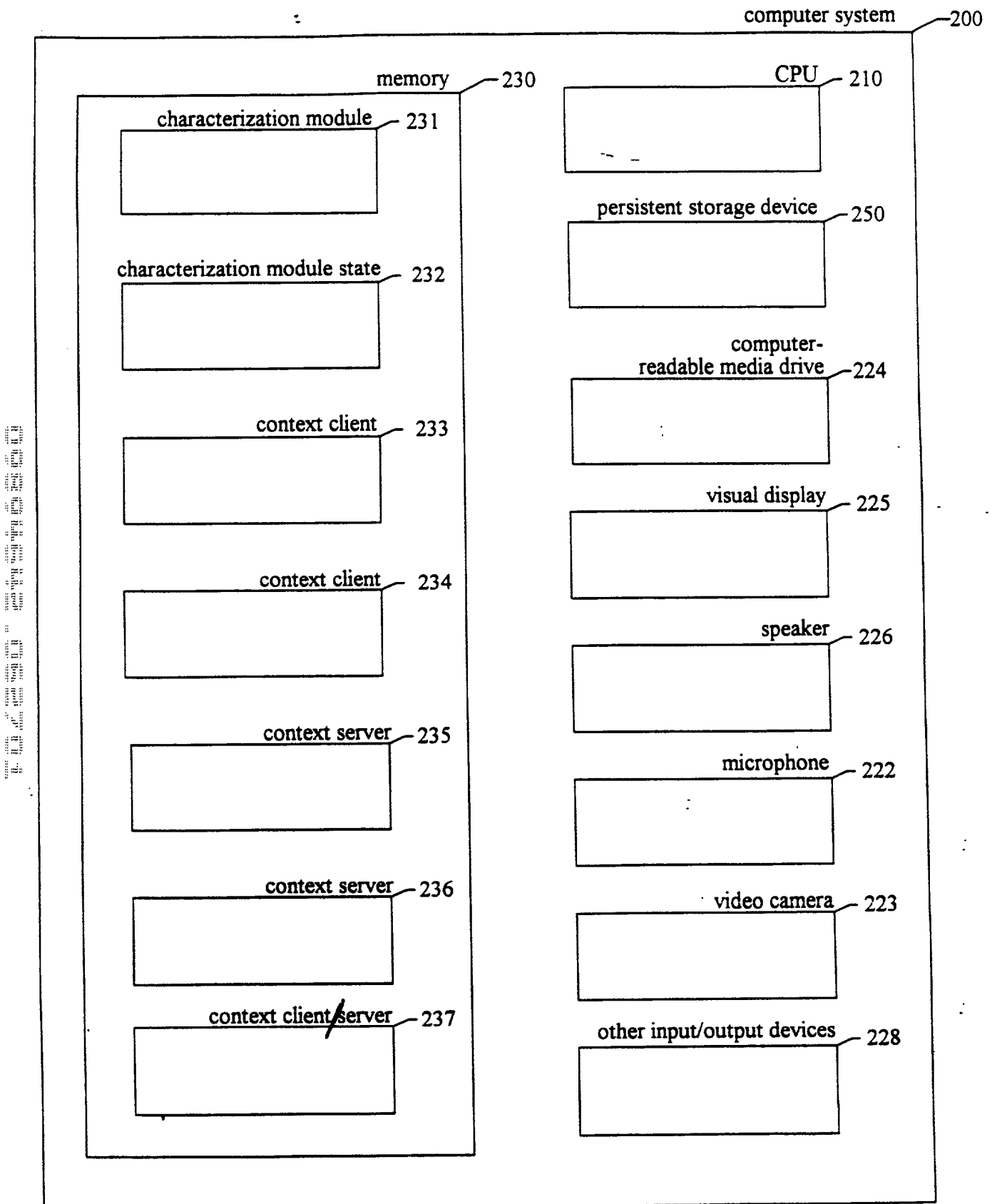


Fig. 2

FIG. 3 is a block diagram of a system 300 for characterizing a user's location and movement. The system 300 includes a context server (GPS) 310, a context server (CIPS) 320, a characterization module 330, a context client (distance from home) 340, a context client (location map) 350, and a context client/server 360. The context server (GPS) 310 provides a user location attribute 311 to the characterization module 330. The context server (CIPS) 320 provides a user location attribute 321 and a user elevation attribute 322 to the characterization module 330. The characterization module 330 provides a user in-region attribute 331 to the context client/server 360 and a user location attribute 332 to the context client (location map) 350. The context client (location map) 350 provides a user elevation attribute 352 to the context client/server 360. The context client (distance from home) 340 provides a user location attribute 341 to the characterization module 330. The context client/server 360 provides a user in-region attribute 361 to the characterization module 330.

310

320

CONTEXT
SERVER
(GPS)

CONTEXT
SERVER
(CIPS)

user
location
attribute
311

user
location
attribute
321

user
elevation
attribute
322

user
in-region
attribute
331

user
location
attribute
332

CHARACTERIZATION MODULE

user
location
attribute
341

user
in-region
attribute
351

user
elevation
attribute
352

user
location
attribute
361

user
in-region
attribute
362

CONTEXT
CLIENT
(distance-
from-home)

CONTEXT
CLIENT
(location-
map)

CONTEXT
CLIENT/
SERVER

FIG. 3

340

350

360

context server table

context server name	version	installation date	filename	request handler
gps	1	2/10/2000	gps.exe	(reference)
ips	1	2/21/2000	ips.exe	(reference)
location_region_analysis	1	2/10/2000	l_r_a.exe	(reference)

FIG 4

attribute instance table

attribute name	context server name	value	uncertainty	timestamp	units	number of context clients consuming
user.location	gps	47° 38.73' N, 122° 18.43' W	0° .09'	13:11:04.023 2/22/2000	degrees/minutes	2
user.location	ips	47° 38.745' N, 122° 18.424' W	0° .021'	13:11:01.118 2/22/2000	degrees/minutes	2
user.elevation	ips	22	.5	13:11:01.118 2/22/2000	meters	1
user.in_region	location_region_analysis	none	none	none	none	0

FIG 5

context client table

context client name	message handler
location map	(reference)
distance from home	(reference)
region analysis	(reference)

FIG 6

attribute instance table

attribute name	context server name	value	uncertainty	timestamp	units	number of context clients consuming
user.location	gps	47° 38.73' N, 122° 18.43' W	0° 09'	13:11:04.023 2/22/2000	degrees/minutes	2
user.location	ips	47° 38.745' N, 122° 18.424' W	0° 021'	13:11:01.118 2/22/2000	degrees/minutes	2
user.elevation	ips	22	.5	13:11:01.118 2/22/2000	meters	1
user.in_region	location_region_analysis	none	none	none	none	1

FIG 7

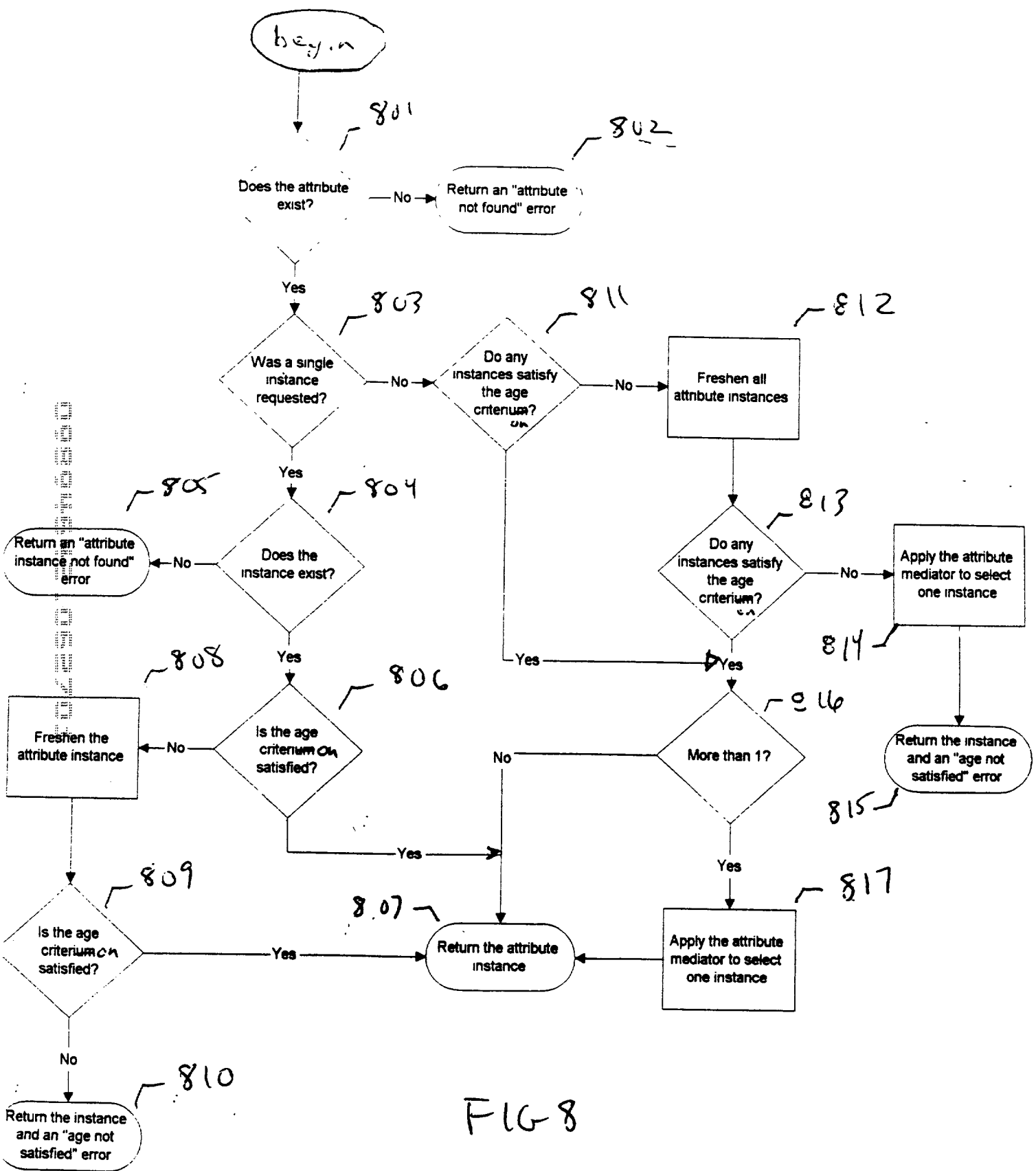


FIG 8

attribute instance table

attribute name	context server name	value	uncertainty	timestamp	units	number of context clients consuming
user.location	gps	47° 38.73' N, 122° 18.43' W	0° .09'	13:11:04.023 2/22/2000	degrees/minutes	2
user.location	ips	47° 38.745' N, 122° 18.424' W	0° .021'	13:11:01.118 2/22/2000	degrees/minutes	2
user.elevation	ips	22.25	.5	13:11:06.565 2/22/2000	meters	1
user.in_region	region analysis	none	none	none	none	1

FIG 9

condition table

condition name	context client name	first logical parameter	second logical parameter	comparison value	logical operator
in region true	region analysis	user.in_region	none	TRUE	=

FIG 10

11:11:29.101 2/22/2000 13:11:29.101 2/22/2000

1100

condition monitor table

condition monitor name	context client name	condition name	behavior	frequency	condition last evaluated	trigger handler reference	stopped
region_boundaries_crossed	region_analyses	in_region_true	TRUE or FALSE	30	13:11:29.101 2/22/2000	(reference)	no

1118

1117

1116

1115

1114

1113

1112

1111

FIG 11

1200

condition monitor table

condition monitor name	context client name	condition name	behavior	frequency	condition last evaluated	trigger handler reference	stopped
region_boundaries_crossed	region_analyses	in_region_true	TRUE or FALSE	30	13:11:59.101 2/22/2000	(reference)	yes

1201

1211

1212

1213

1214

1215

1216

1217

1218

FIG 12

FIG. 13

FIG. 13

FIG. 13

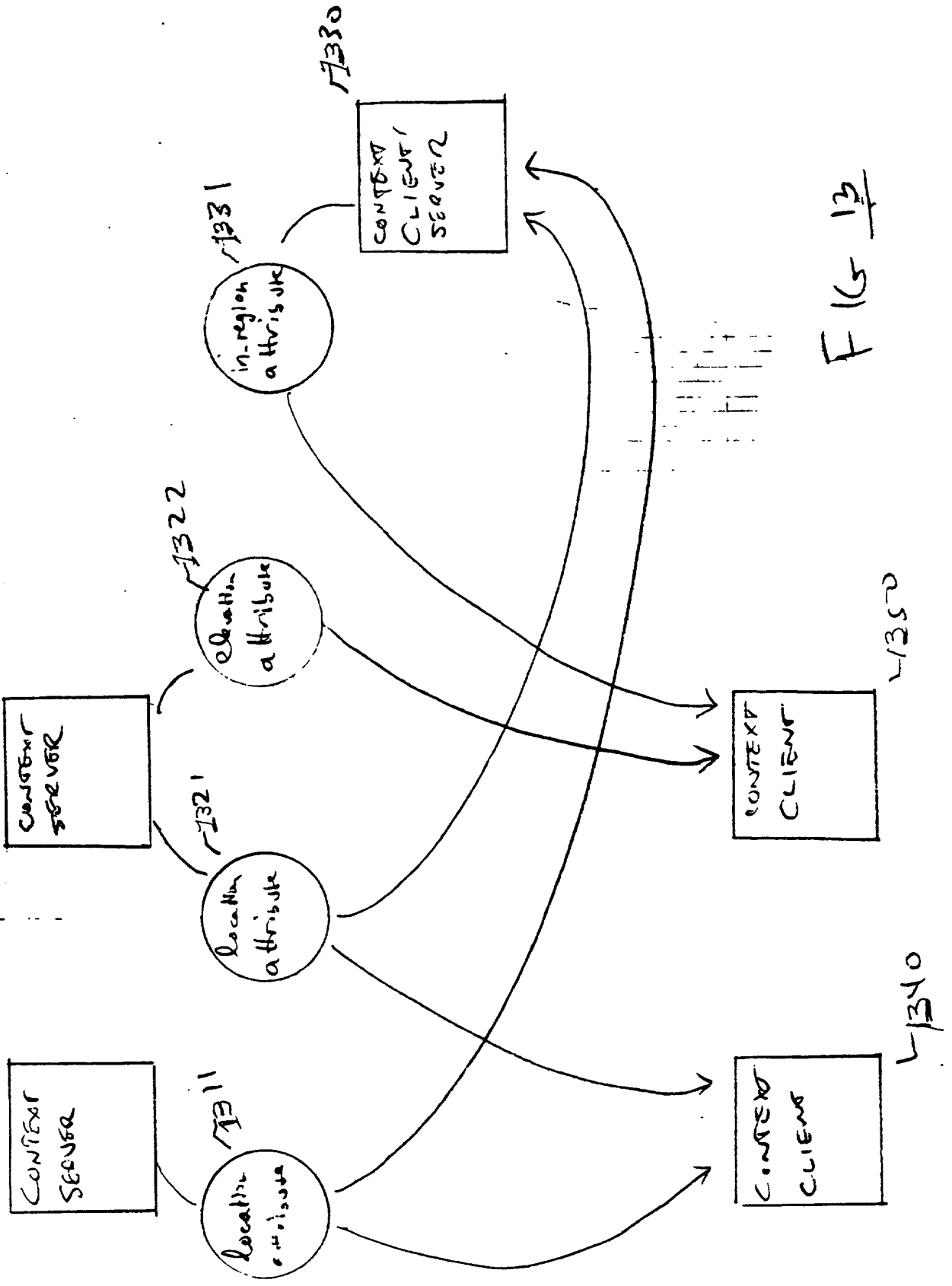


FIG. 13

attribute request table

attribute name	context client name
user.location	distance_from_home
user.in_region	location_map
user.location [gps]	location_region_analysis
user.elevation	location_map

Figure 14

1401 ~
1402 ~
1403 ~
1404 ~

1411

1412

User.

Desired_privacy_level
 Interruptibility
 Speed
 Direction
 Acceleration
 Availability.
 Cognitive_availability
 Tactile_availability
 Manual_availability
 Visual_availability
 Oral_availability
 Auditory_availability
 Proximity.<Item or place name>
 Mood.

Happiness
 Sadness
 Anger
 Frustration
 Confusion

Activity.

Driving
 Eating
 Running
 Sleeping
 Talking
 Typing
 Walking

Location.

Place_name
 Latitude
 Longitude
 Altitude
 Room
 Floor
 Building
 Address
 Street
 City
 County
 State
 Country
 Postal_Code

Destination. (same as User.Location.)

Physiology.

Pulse
 Body_temperature
 Blood_pressure
 Respiration

Person.<name or ID>. (same as User.)

Platform.**UI.**

Oral_input_device_availability
 Manual_input_device_availability
 Tactile_output_device_availability
 Visual_output_device_availability
 Auditory_output_device_availability

Platform. (continued)**CPU.**

Load
 Speed

Memory.

Total_capacity
 Used

Storage.

Total_capacity
 Used

Connectivity.

Connection_status
 Connection_speed
 Connection_type/device
 Connection_activity

Power.

Power_source
 Power_level

Environment.**People.**

Nearest
 Number_present
 Number_close

Local.

Time
 Date
 Temperature
 Pressure
 Wind_speed
 Wind_direction
 Absolute_humidity
 High_forecast_temperature
 Low_forecast_temperature
 People_present
 Ambient_noise_level
 Ambient_light_level
 Days.<previous or future>.
 High_temperature
 Low_temperature
 Precipitation_type
 Precipitation_amount

Place.<place name>. (same as Environment.Local)

Application.**Mail.**

Available
 New_messages_waiting
 Messages_waiting_to_be_sent

Phone.

Available
 In_use
 On/off
 Notification_mechanism
 Call_incoming
 Caller_ID

Sound_recorder.

Available
 Recording

Fig. 15

1) User Setting

a) Mental Context

- i) Meaning
- ii) Cognition
 - (1) Divided User Attention
 - (2) Task Switching
 - (3) Background Awareness
- iii) Solitude
- iv) Privacy
 - (1) Desired Privacy
 - (2) Perceived Privacy
- v) Social Context
- vi) Affect

b) Physical Situation

- i) Body
 - (1) Biometrics
 - (2) Posture
 - (3) Motion
 - (4) Physical Encumbrment
 - (a) Senses
 - (i) Eyes
 - (ii) Ears
 - (iii) Tactile
 - (iv) Hands
 - (v) Nose
 - (vi) Tongue
 - (b) Workload demands/effects
 - (c) Interaction with computer devices
 - (d) Interaction with people
 - (e) Physical Health
- ii) Environment
 - (1) Time/Space
 - (2) Objects
 - (3) Persons
 - (a) Audience/Privacy Availability
 - (i) Scope of Disclosure
 - (ii) Hardware affinity for privacy
 - (iii) Privacy Indicator for User
 - (iv) Privacy Indicator for Public
 - (v) Watching Indicator
 - (vi) Being Observed Indicator
 - (4) Ambient Interference
 - (a) Visual
 - (b) Audio
 - (c) Tactile

2) Computer

a) Power

b) Configuration

i) User Input Systems

- (1) Hand/Haptic
 - (a) Keyboard/Keystrokes
- (2) Voice/Audio
- (3) Eye Tracking
- (4) Cursors
 - (a) Axis
 - (b) Resolution
 - (i) Selection
 - (ii) Invocation
 - (c) Accelerators

ii) Output Systems

- (1) Visual
 - (a) Resolution
- (2) Audio
 - (a) Public/Private
- (3) Haptic

iii) External Resources

- (1) I/O devices
- (2) Connectivity

c) Data

- i) Quantity/State
- ii) Urgency/Importance
 - (1) Use of Prominence
- iii) Modality
- iv) Sensitivity/Purpose
 - (1) Privacy Issues
 - (2) Use of Association
 - (3) Use of Safety
- v) Source/Ownership
 - (1) Types
 - (a) User generated
 - (b) Other computers or people
 - (c) Sensor
 - (d) PC State
 - (2) Use of Association

Fig. 16

Fig. 17

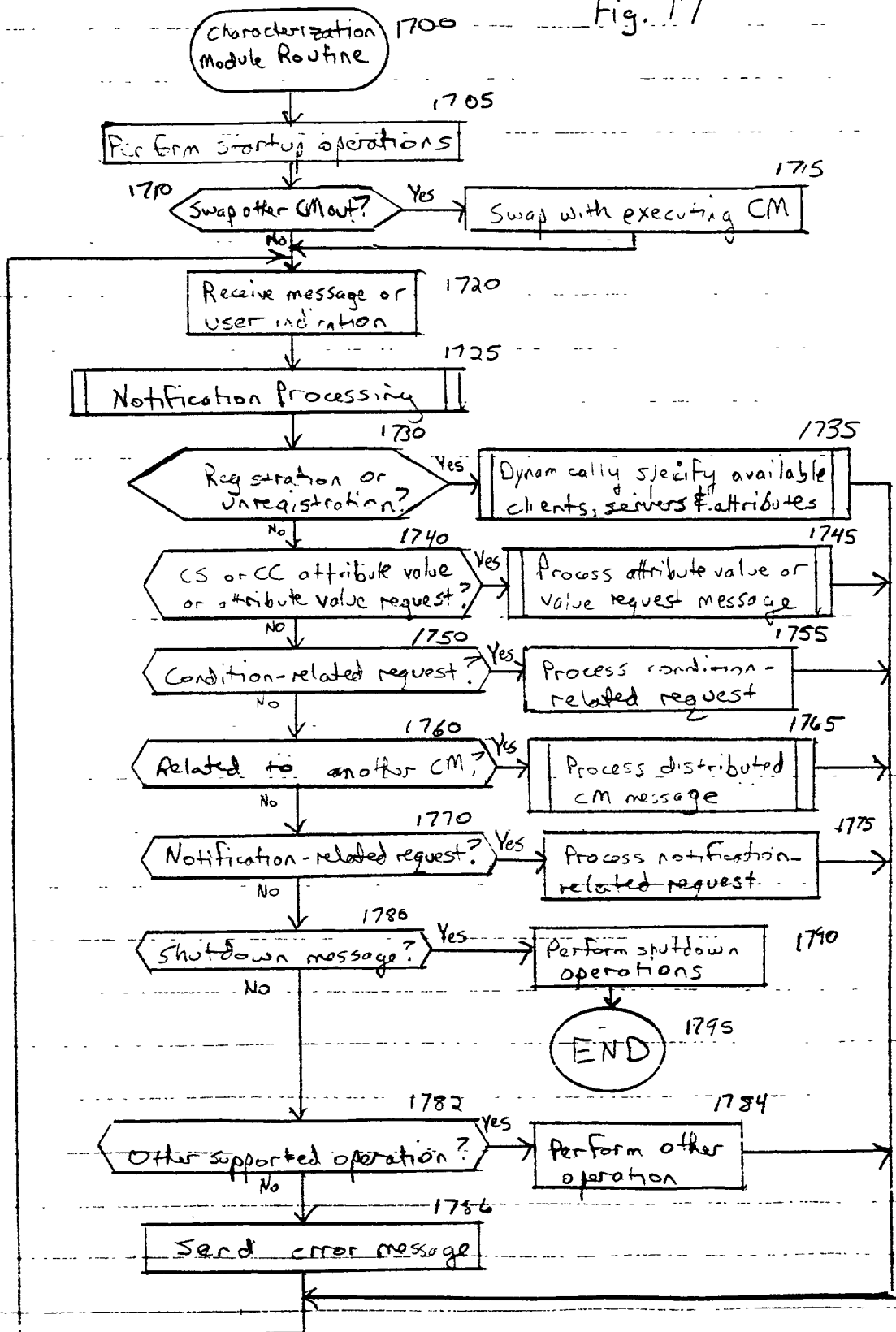


Fig. 18

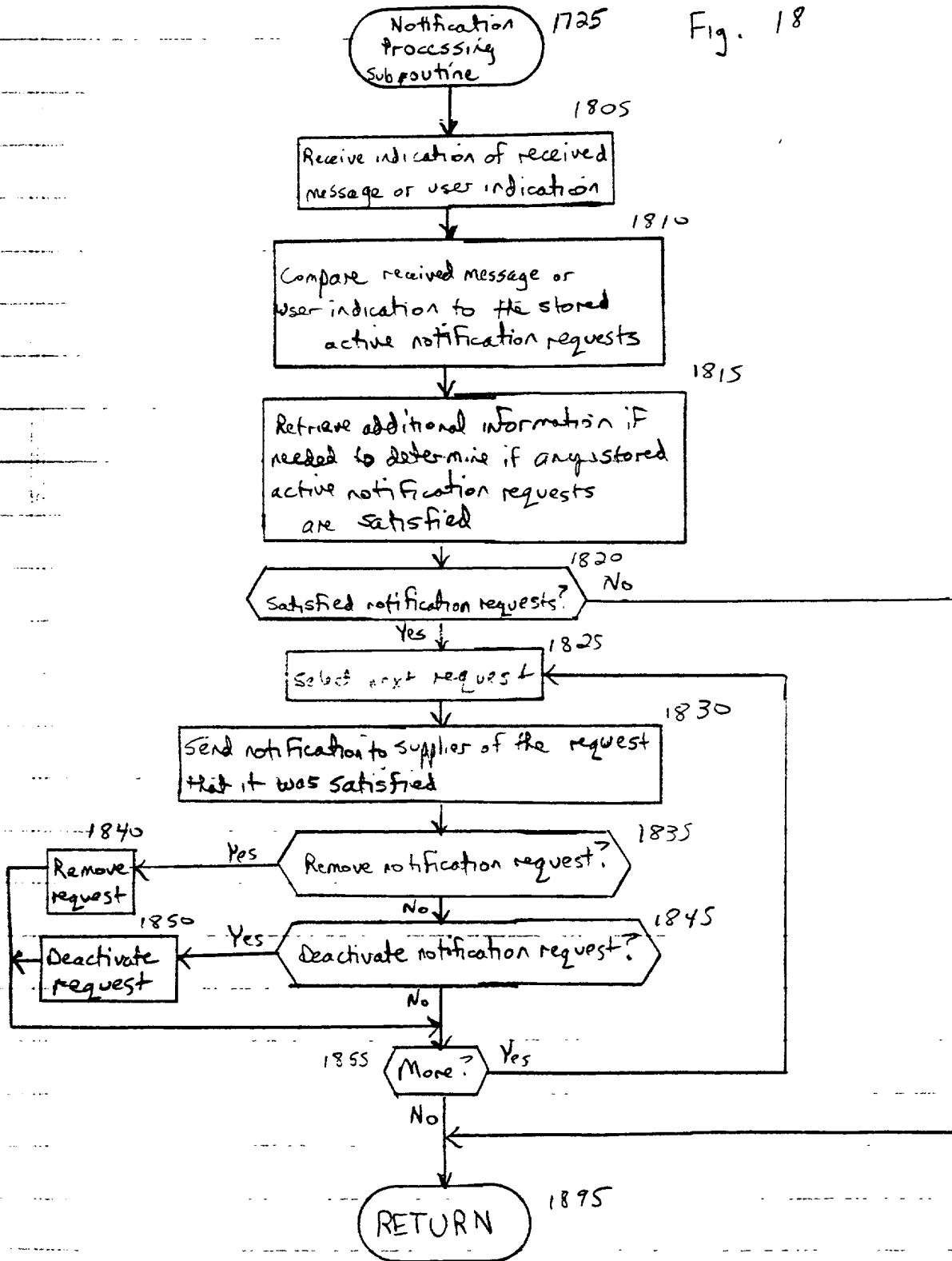
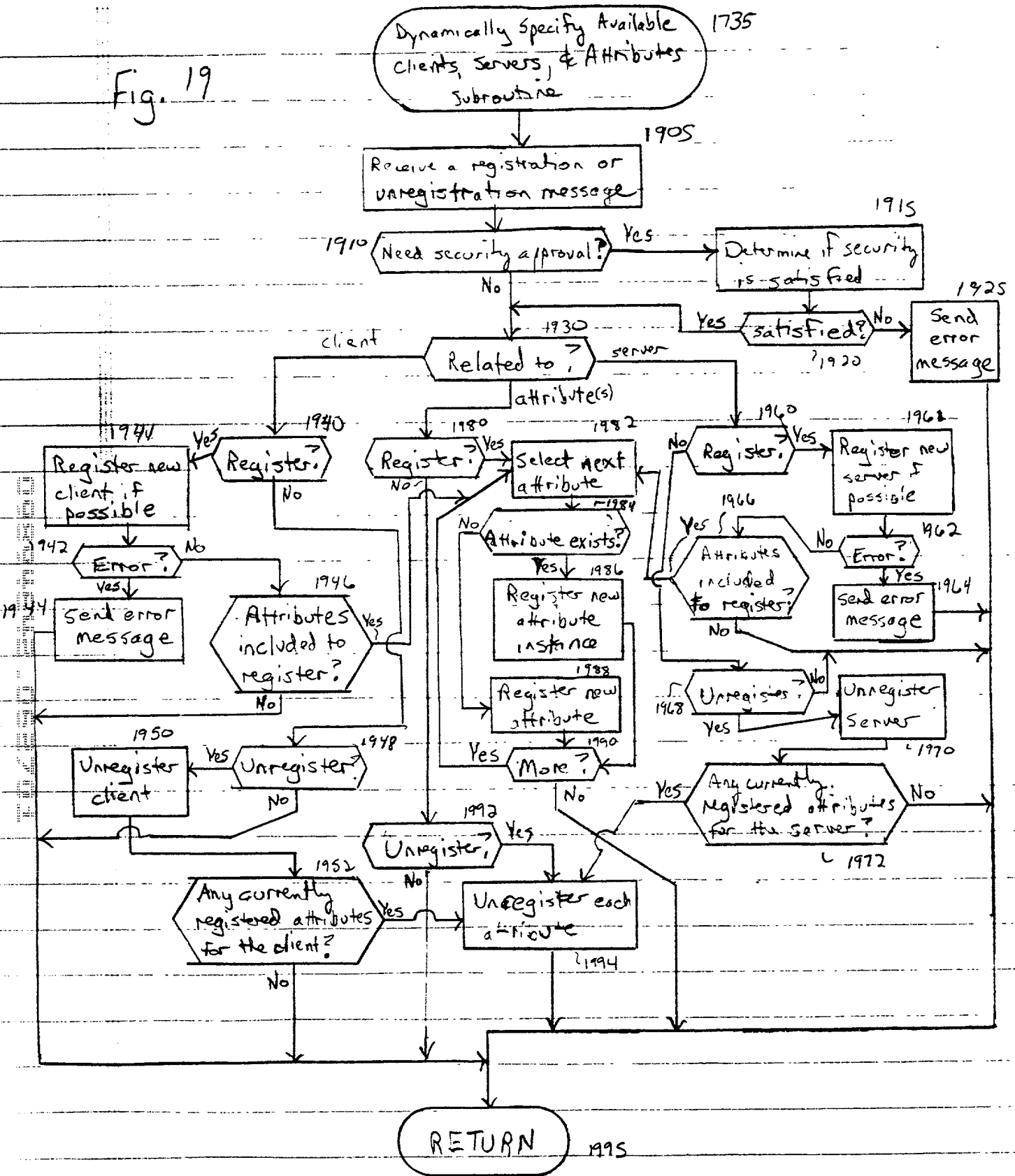


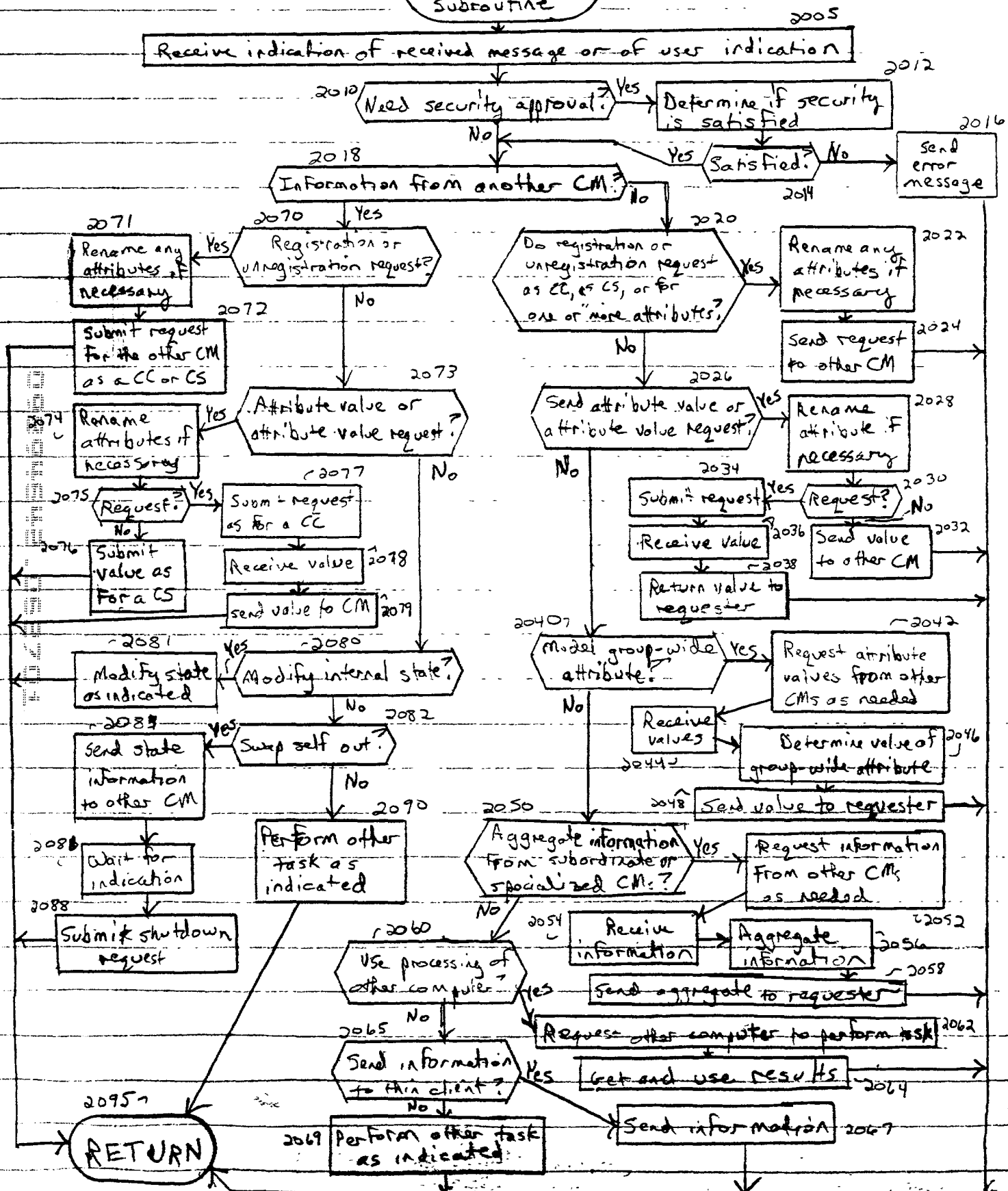
Fig. 19



Process Distributed CM Message Subroutine

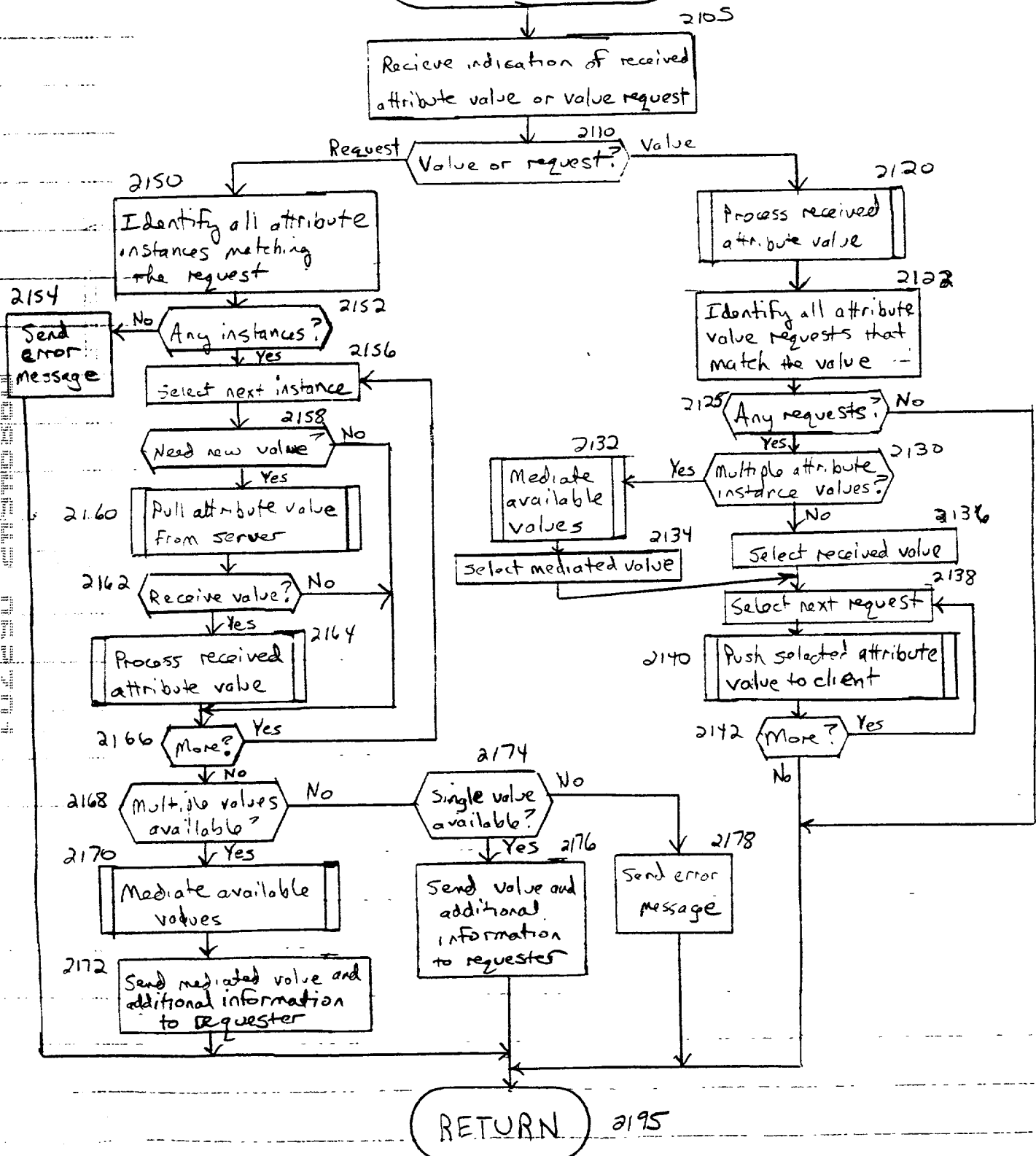
1765

Fig. 20



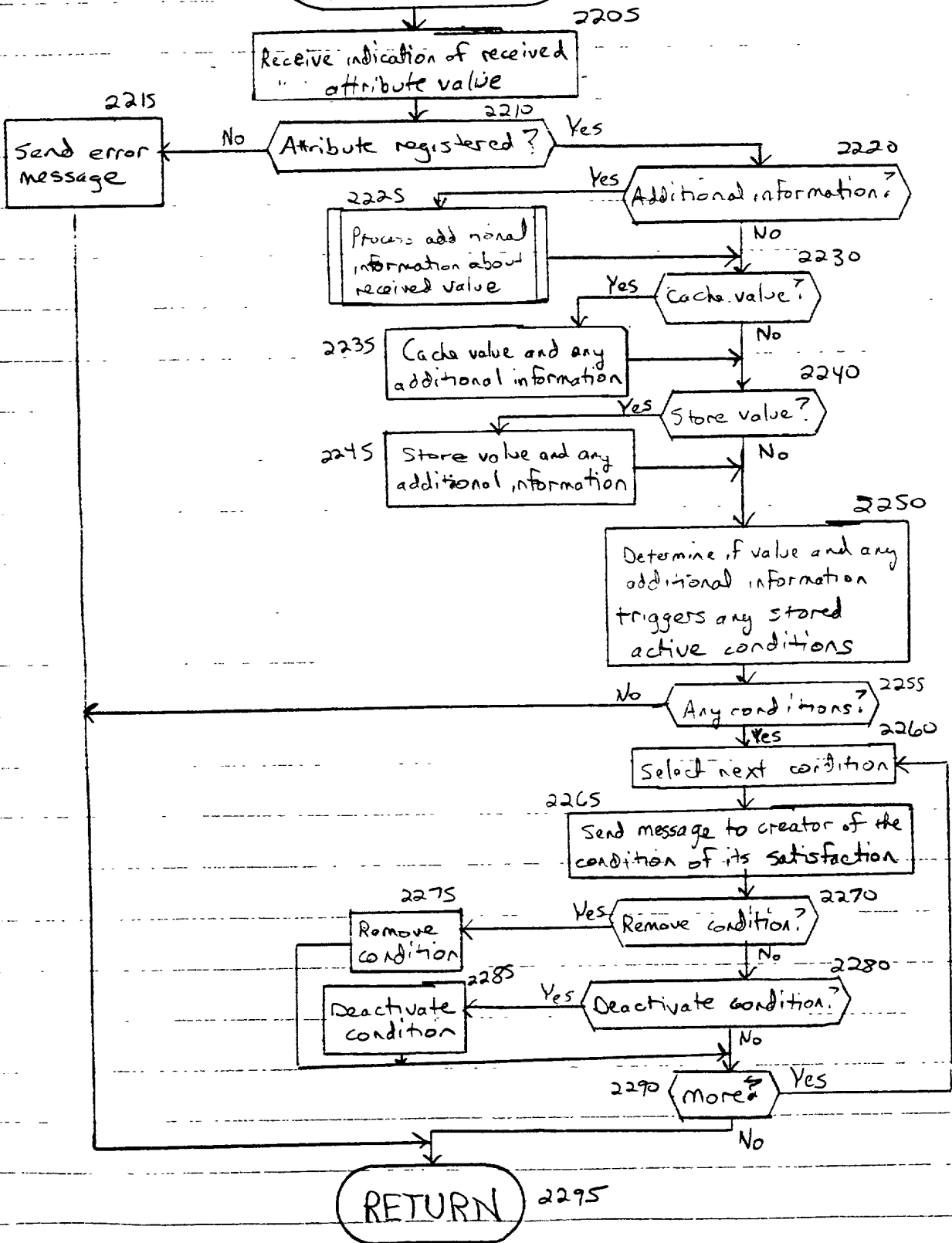
Process Attribute Value or Value Request Message Subroutine

Fig. 21



Process Received
Attribute Value
subroutine

2200 Fig 22



2225
Process Additional Information
About Received Value
Subroutine

Fig. 23

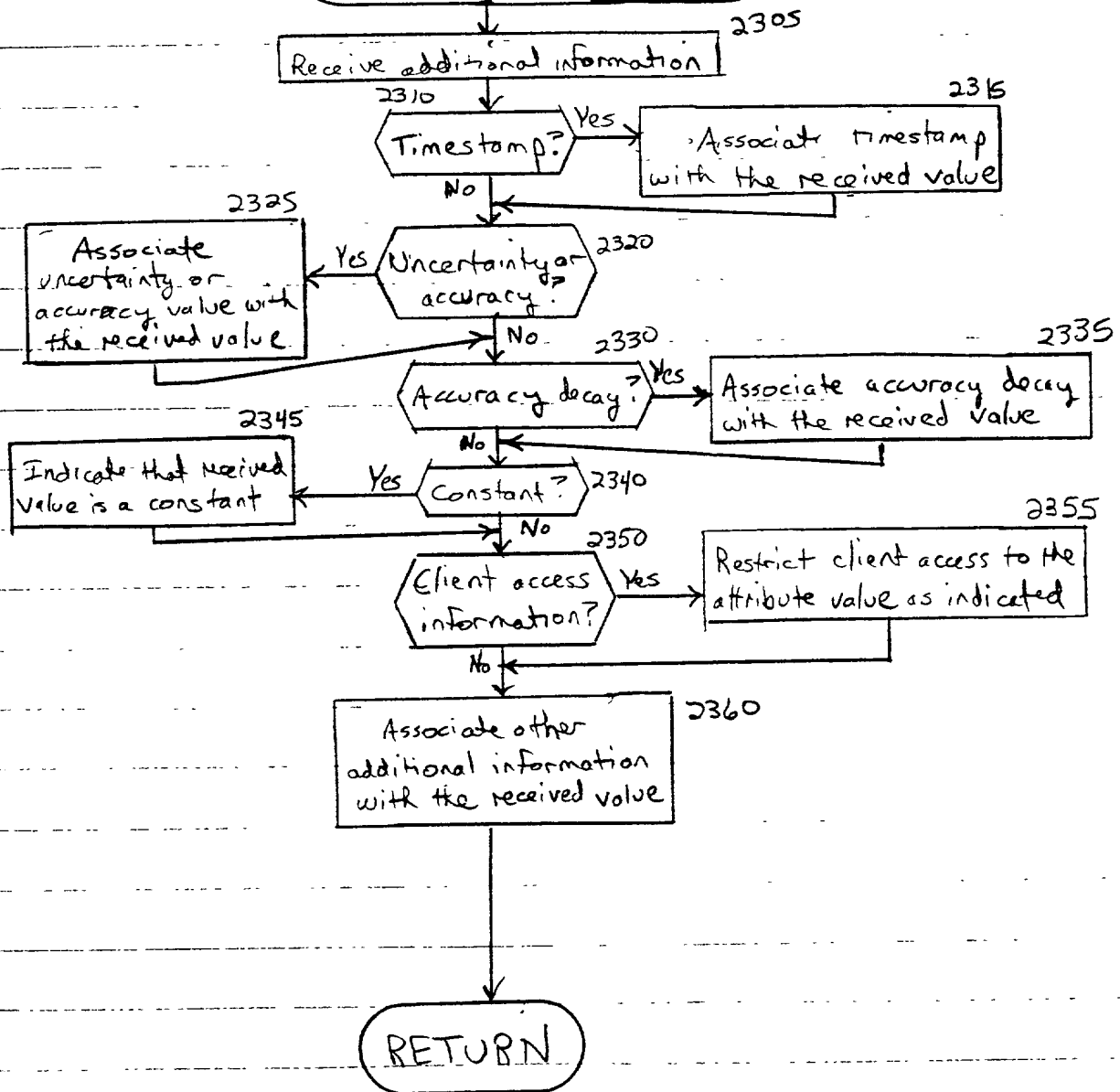


Fig. 24

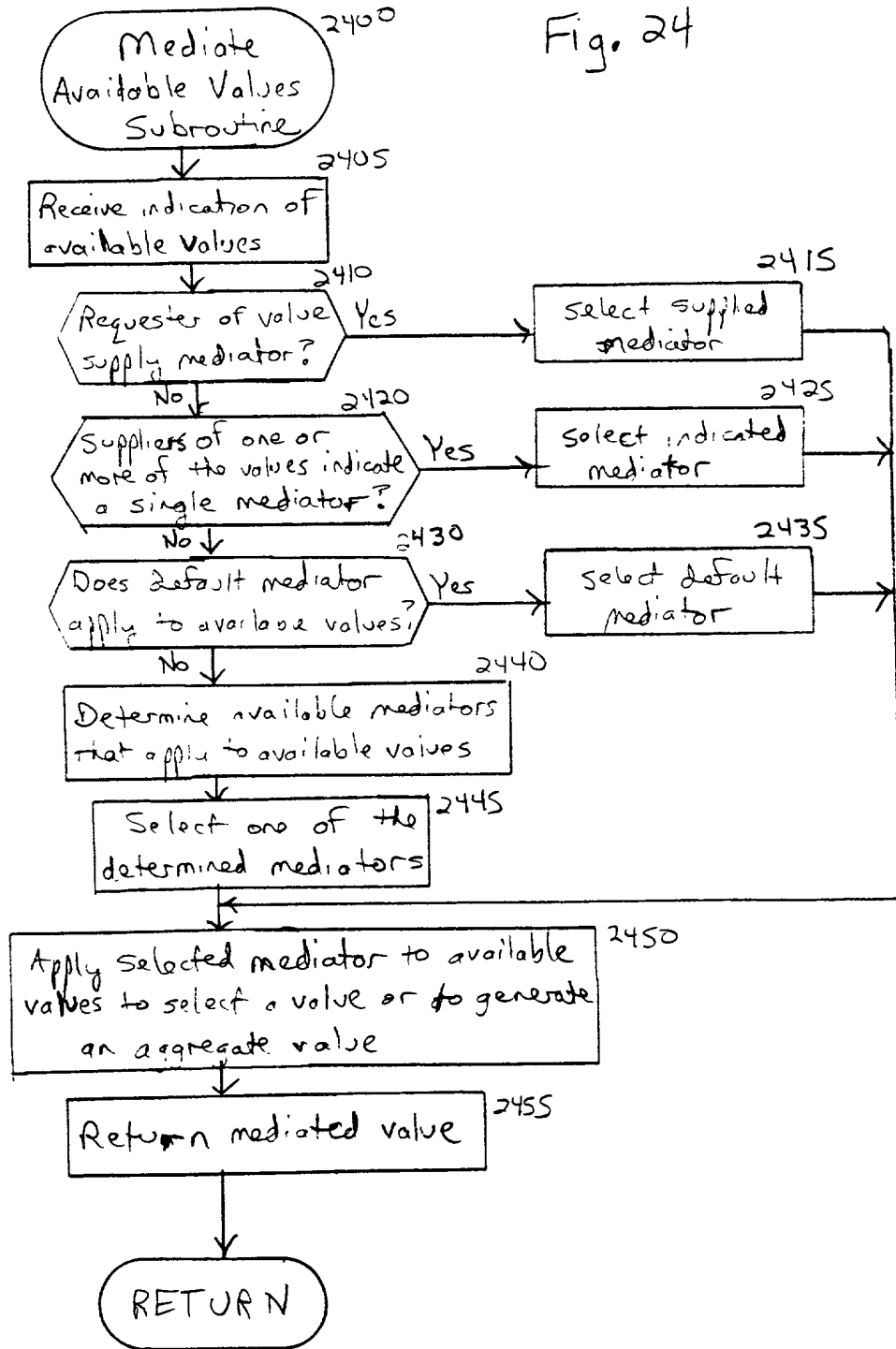


Fig. 25

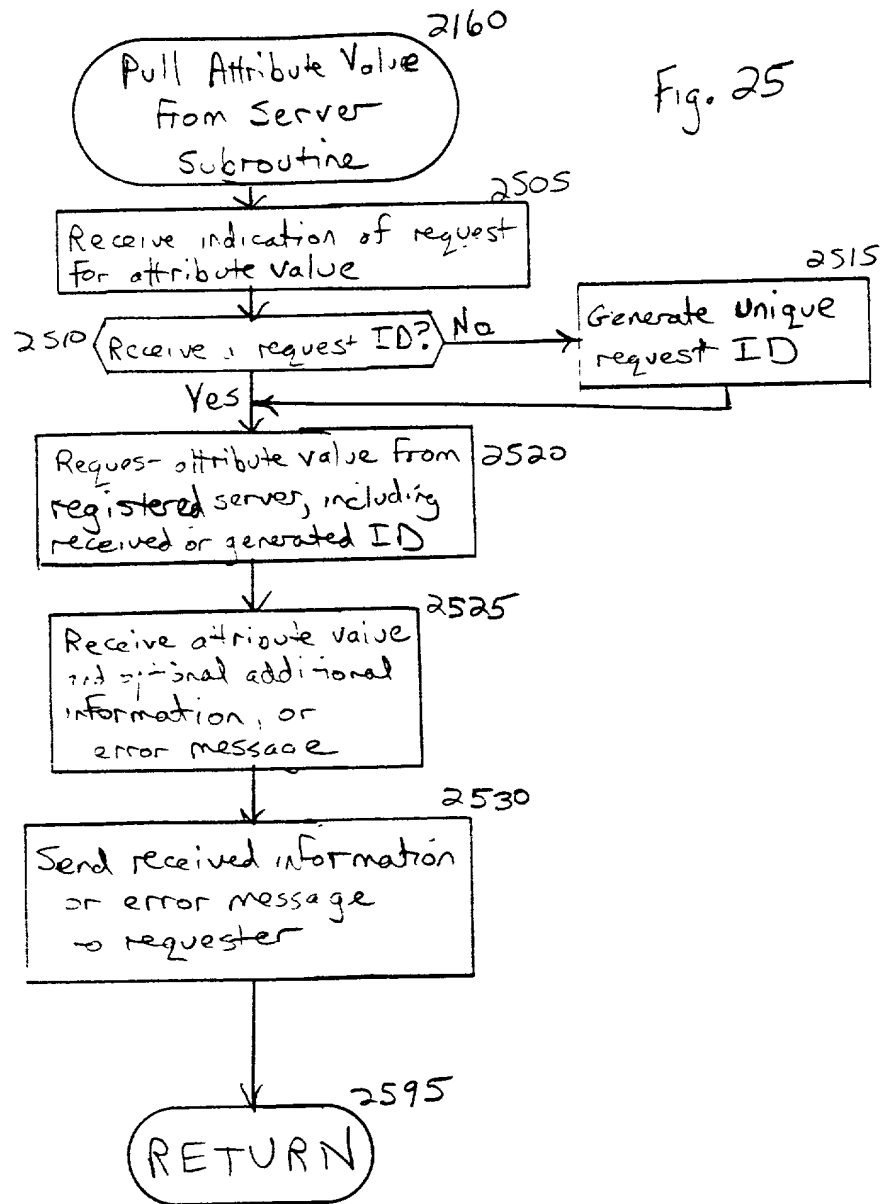
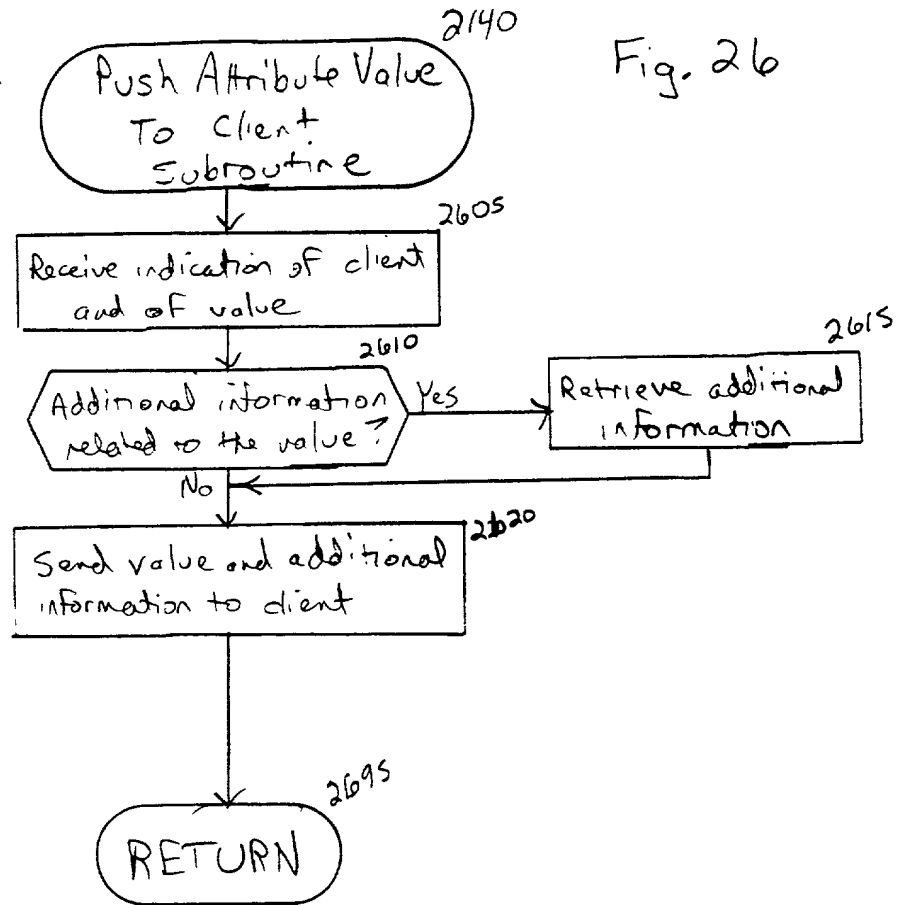
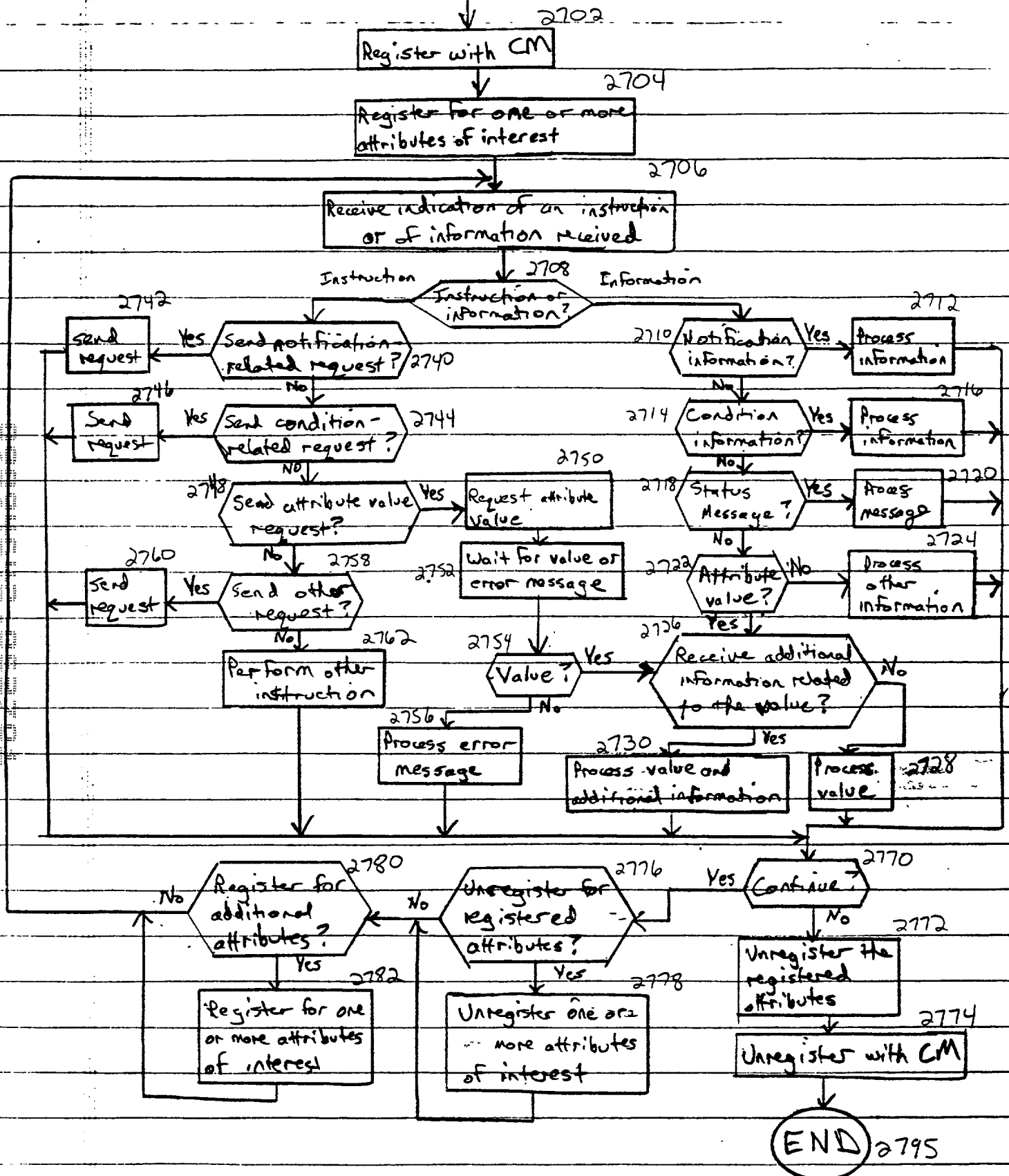


Fig. 26



Context Client Routine 2700

Fig. 27



Context Server Routine 2800

Fig. 28

